

CLAIMS

## WHAT IS CLAIMED IS:

1. A radiation source comprising:
  - an outer housing having a fastener, said outer housing configured to be opened;
  - 5 a substrate removably contained within said outer housing, said substrate having a front surface; and
  - a radioactive deposit fixedly deposited upon said front surface, said radioactive deposit having a radioisotope
2. The radiation source according to claim 1, wherein said substrate is flexible.
- 10 3. The radiation source according to claim 2, wherein said substrate has a first form factor when contained within said outer housing, and said substrate is manipulable to have a second form factor smaller than said first form factor when said substrate is removed from said outer housing.
4. The radiation source according to claim 2, wherein said substrate is made of one of paper and plastic.
- 15 5. The radiation source according to claim 1, wherein at least a portion of said radioactive deposit has at least two layers.
6. The radiation source according to claim 5, wherein the activity density of each of said at least two layers is substantially the same.
- 20 7. The radiation source according to claim 1, wherein said substrate is radiopaque.
8. The radiation source according to claim 1, wherein said radioactive deposit includes a colorant.

9. The radiation source according to claim 8, wherein said the color of a portion of said radioactive deposit corresponds to the activity level of said portion of said radioactive deposit
10. The radiation source according to claim 1, wherein said radioactive deposit includes a binding agent for fixedly depositing said radioactive deposit on said front surface.
- 5 11. The radiation source according to claim 1, wherein said radioactive deposit is fixedly deposited upon said front surface by covering said radioactive deposit and said front surface with a sealing layer.
12. The radiation source according to claim 1, said fastener being a latching mechanism that may be selectively unfastened.
- 10 13. The radiation source according to claim 1, said outer housing being configured to be opened by the removal of said fastener.
14. The radiation source according to claim 1, further including a second substrate with a second radioactive deposit deposited thereon, said second substrate being contained within said outer housing.
- 15 15. The radiation source according claim 14, wherein the combination of said radioactive deposit and said second radioactive deposit produces a desired radioactive deposit.
16. The radiation source according to claim 1, wherein said radioactive deposit has a substantially uniform activity distribution.
- 20 17. A radiation source for calibration of nuclear imaging equipment, said radiation source comprising:
  - a outer housing having a fastener, said outer housing configured to be opened;
  - a flexible substrate removably contained within said outer housing, said substrate having a front surface; and

a radioactive deposit fixedly deposited upon said front surface, said radioactive deposit  
 having a radioisotope, a binding agent, and a colorant, wherein  
 at least a portion of said radioactive deposit has at least two layers, each layer having  
 substantially the same activity density, and  
 5 the color of a portion of said radioactive deposit indicates the activity level of said portion of  
 said radioactive deposit.

18. A radiation source for calibration of nuclear imaging equipment, said radiation source  
 comprising:  
 a outer housing having a fastener, said outer housing configured to be opened;  
 10 a flexible substrate removably contained within said outer housing, said substrate having a  
 front surface;  
 a radioactive deposit fixedly deposited upon said front surface, said radioactive deposit  
 having a radioisotope, and a colorant; and  
 a sealing layer covering said radioactive deposit and said front surface of said substrate ,  
 15 wherein  
 at least a portion of said radioactive deposit has at least two layers, each layer having  
 substantially the same activity density, and  
 the color of a portion of said radioactive deposit indicates the activity level of said portion of  
 said radioactive deposit.

20 19. A method of making a radiation source, said method comprising:  
 positioning a substrate relative to a liquid deposition head, said liquid deposition head having  
 an opening through which a deposited solution may be deposited onto a portion of a front  
 surface of said substrate;  
 depositing said deposited solution onto said front surface to form a specified radioactive  
 25 deposit;  
 removing a solvent from said deposited solution;

fixing the position of said radioactive deposit on said front surface;  
 opening a outer housing having a fastener; and  
 placing said substrate within said outer housing.

20. The method according to claim 19, wherein said substrate is initially blank.

5 21. The method according to claim 19, wherein said substrate is initially imprinted with a  
 depleted radioactive deposit, and further including:  
 measuring the activity distribution of said depleted radioactive deposit; and  
 designing said specified radioactive deposit based on the difference between a desired  
 radioactive deposit and said depleted radioactive deposit.

10 22. The method according to claim 19, positioning said substrate including moving said substrate  
 using a feeding mechanism.

23. The method according to claim 22, wherein said feeding mechanism is a roller, and moving  
 said substrate includes placing said substrate in contact with a roller and causing said roller to  
 rotate.

15 24. The method according to claim 23, wherein said substrate has a back surface, and said roller  
 is only in contact with said back surface of said substrate.

25. The method according to claim 19, wherein said substrate is flexible.

20 26. The method according to claim 19, fixing said position of said radioactive deposit on said  
 front surface including applying a sealing layer to cover said radioactive deposit and said  
 front surface.

27. The method according to claim 19, fixing said position of said radioactive deposit on said  
 front surface including mixing a binding agent into said deposited solution prior to depositing  
 said deposited solution on said front surface of said substrate.

28. The method according to claim 19, further including dissolving a compound containing a radioisotope in a solvent.
29. The method according to claim 19, further including dissolving a compound containing a radioisotope precursor in a solvent and irradiating said radioisotope precursor to transform it into a radioisotope.
30. The method according to claim 19, further including adsorbing a radioisotope to a particulate and dispersing said particulate in said deposited solution.
31. The method according to claim 19, further including:  
receiving a depleted substrate having a depleted radioactive deposit; and  
measuring the activity distribution of said depleted radioactive deposit, wherein  
said specified radioactive deposit is designed based on the difference between a desired  
radioactive deposit and said depleted radioactive deposit.
32. The method according to claim 31, wherein said substrate is said depleted substrate.
33. The method according to claim 19, wherein said substrate is in the form of a continuous web,  
and said method further including cutting said substrate to fit within said outer housing.